the applicator stick. The invention also provides a method of analyzing a sample collected with an applicator stick comprising a shaft and a sample collection head, wherein the cartridge includes (a) a sample chamber having an elongated cavity that has a first region and a second region, the regions oriented at an angle with respect to each other and the angle is selected to bend the shaft upon insertion of the applicator stick into the sample chamber and promote fracture of the shaft, wherein the sample chamber further comprises a sample collection head retention feature; (b) an extraction buffer chamber connected to an extraction buffer vent port through an integrated filter element to an extraction buffer conduit; (c) a waste chamber; (d) a first detection chamber connected to the sample chamber via a sample conduit comprising a first sample conduit branch, the first detection chamber is connected to the waste chamber via a waste conduit; (e) a second detection chamber connected to the sample chamber via a sample conduit comprising a second sample conduit branch, the second detection chamber is connected to the waste chamber via the waste conduit; and (f) a reagent chamber containing a volume of a liquid reagent, the reagent chamber being connected to the sample conduit through a reagent conduit; wherein the method comprises the steps of (i) inserting the applicator stick into the sample chamber such that the swab head contacts the retention feature, (ii) breaking the swab head within the sample chamber; (iii) extracting the sample from the swab head; (iv) moving the extracted sample from the sample chamber into the first and second sample conduit branches; (v) moving a slug of the extracted sample having a predetermined volume into the first and second detection chambers and (vi) moving the extracted sample in the first and second detection chambers into the first waste chamber; (vii) moving the first liquid reagent into the first and second detection chambers; and (viii) measuring a signal from the first and second detection chambers. The sample conduit may include a dry reagent, in which case the method includes reconstituting the dry reagent in the sample conduit prior to the extracting step (iii).

[0016] In a specific embodiment, the first detection chamber comprises a first set of assay reagents and the second detection chamber comprises a second set of assay reagents, and the measuring step (viii) comprises conducting duplicate or different measurements of an analyte of interest in the first and second detection chambers. In one embodiment, the measuring step (viii) comprises conducting a first measurement of a first analyte and conducting a second measurement of a second analyte. The first detection chamber may be configured for detection and typing of influenza virus and the measuring step (viii) comprises measuring a signal that indicates the presence or absence of a type of influenza virus in the sample. For example, the first set of assay reagents comprise an antibody directed to a target selected from the group consisting of influenza A nucleoprotein, influenza B nucleoprotein, and combinations thereof, and the measuring step (viii) comprises measuring a signal that indicates the presence or absence of the target in the sample. The first set of assay reagents may further comprise an antibody directed to an additional target selected from the group consisting of influenza C, adenovirus, parainfluenza, human metapneumovirus, and combinations thereof, and the measuring step (viii) further comprises measuring a signal that indicates the presence or absence of the additional target in sample. Moreover, the second set of assay reagents comprise antibodies directed to at least two different hemagglutinin (HA) antigen subtypes and the measuring step (viii) further comprises measuring a signal that indicates the presence or absence of the at least two different HA antigen subtypes. The two different HA antigen subtypes may be selected from the group consisting of H1, H3, H1 from swine origin influenza virus (SOIV), atypical hemagglutinin subtype, pandemic hemagglutinin subtype, H2, H5, H7, H9, and combinations thereof.

[0017] The invention also provides an assay cartridge comprising a cartridge body including a reagent chamber adapted to receive a cylindrical ampoule, wherein the reagent chamber comprises side walls and a plurality of support brackets protruding from the side walls, wherein the support brackets are configured to provide a multi-point cradle support for the cylindrical ampoule. The side walls may be sloped such that the width of the reagent chamber at the base of the reagent chamber is narrow relative to the width of the reagent chamber at the top of the reagent chamber. The plurality of support brackets may be sloped inward such that the width of the width of the cradle support is narrower at the bottom of the reagent chamber than at the top.

[0018] Further, the invention contemplates art assay cartridge comprising a sample chamber connected to a collection component via a collection conduit, the collection component comprising a collection chamber and a sensing chamber, wherein the collection chamber is connected to (i) the collection conduit, wherein the collection conduit is connected to the top of the collection chamber and is positioned proximal to a wall of the collection chamber, (ii) an output conduit connected to the bottom of the collection chamber; and (iii) a sensing conduit comprising a tube that extends down from the top of the collection chamber to a pre-defined height in the collection chamber, wherein the sensing chamber connects to the sensing conduit at the top of the sensing chamber and proximal to a wall of the sensing chamber and the sensing chamber also connects to a sensing chamber vent. The collection chamber may further include a baffle positioned at the top of the collection chamber, adjacent to the collection conduit and between the collection and sensing conduits. Moreover, the collection component further comprises an optical sensor adapted to detect the presence of liquid in the sensing chamber. The invention further provides a method of collecting a liquid in an assay cartridge as described herein, wherein the method comprises (i) introducing liquid into the collection chamber via the collection conduit until a liquid level reaches the pre-defined height in the collection chamber; (ii) introducing additional liquid into the collection chamber via the collection conduit such that the additional liquid is transferred through the sensing conduit into the sensing chamber; (iii) detecting liquid in the sensing chamber via the optical sensor; and (iv) transferring liquid from the collection chamber through the outlet conduit. The liquid introduced into the collection chamber may contain bubbles and the liquid transferred through the outlet conduit is substantially free of bubbles, and optionally, the method removes bubbles from the liquid. The collection chamber may include a baffle positioned at the top of the collection chamber and adjacent to the input conduit, and the method further comprises contacting the liquid with the baffle and the wall of the collection chamber to constrain bubbles within the liquid.

[0019] The assay cartridge may include a detection chamber and a distribution conduit interconnected to a plurality of fluid conduits comprising the outlet conduit, a detection chamber conduit connected to the detection chamber and, optionally, one or more fluid conduits connected to one or